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House Job Training for Engineers

PEC Signs MoUs with 14 Organizations for Graduate Engineer Trainee Program

By **Manzoor Shaikh**

In a major step toward strengthening the professional competence of Pakistan's young engineers, the Pakistan Engineering Council (PEC) has signed Memoranda of Understanding (MoUs) with 14 leading organizations under its flagship Graduate Engineer Trainee (GET) Placement Program.

uate Engineer Trainee (GET) Placement Pro-

Islamabad, was attended by PEC Chairman Engr. Waseem Nazir, senior engi-

The program — often described as a “house job for engineers” — seeks to bridge

hands-on training opportunities to fresh graduates.

Partner organizations include the Frontier Works Organization (FWO), PTCL, Tunneling Institute of Pakistan (TIP), National Institute of Electronics (NIE), National Electronics Complex of Pakistan (NECOP), National Telecommunication Corporation (NTC), Pakistan Telecommunication Authority (PTA), Pakistan Mineral Development Corporation



gram.
The ceremony, held in

neers, and representatives from both the public and private sectors.

the gap between academic learning and practical application by offering structured,

Contd on page 2



PAKISTAN AUTO SHOW

Supplement on

2025

Please See page 3-6

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House Job Training for Engineers

Contd from page 1
(PMDC), Heavy Industries Taxila (HIT), Heavy Mechanical Complex (HMC), Pakistan Ordnance Factories (POF), Islamabad

Electric Supply Company (IESCO), PAKSAT International, and the Pakistan Housing Authority Foundation (PHAF).

A Long-Needed Step Forward

Engineering graduates and professionals have long demanded such a structured, practical training program, noting that academic qualifications alone are not enough to prepare young engineers

for the realities of the field. The GET program aims to fill that gap by offering a six-month training cycle, including five months of field exposure and one month of soft skills development — a format reminiscent of the house-job model successfully

practiced in the medical profession.

Addressing the ceremony, Chairman PEC Engr. Waseem Nazir said the initiative would help graduates transition smoothly from classroom theory to workplace practice.

"This program is about turning knowledge into competence," he said. "We want our engineers to be industry-ready, confident, and capable of contributing to Pakistan's national development."

He added that similar partnerships have already been established with key organizations in other parts of the country, reflecting PEC's plan to expand the initiative nationwide.

A Familiar Model — But with Lessons to Learn
Observers note that this is not PEC's first attempt at such an initiative. During the tenure of former Chairman Engr. Najeeb Haroon, a similar placement program was launched and hailed as a major success by the Council. However, no formal analysis or audit of

that program's outcomes was ever conducted. Over time, reports of mismanagement and irregularities surfaced — allegations that were never formally investigated.

This history has made the engineering community cautiously optimistic about the new program. Many hope that this time PEC will ensure transparency, accountability, and measurable outcomes, avoiding the administrative lapses that tainted previous efforts.

Industry Response and Expectations

Representatives of the 14 partner organizations praised PEC's renewed focus on practical training, describing the collaboration as a timely and visionary effort to align academic output with industry needs. They emphasized that Pakistan's economic and industrial growth depends on a workforce of engineers who are not only theoretically sound but also technically skilled and adaptable.

One industry representative remarked that programs like GET could "reshape the

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PAKISTAN AUTO SHOW 2025

Pakistan's Auto Sector: Paving the Road Toward Localization and Growth

Yet another Auto Show! At the advent of this event, the auto sector stands at a crucial juncture

tion in small cars and 25–30% in larger vehicles and SUVs, while motorcycles have achieved over 90% local content. The progress, although noteworthy, remains far behind regional

logistics, steel and plastics industries, and financial institutions through car financing.

A vibrant auto sector is often considered a barometer of industrial growth and

consumer confidence. In FY25, Pakistan's passenger car sales jumped by nearly 74% year-on-year, signaling a partial revival of consumer activity. However, this rebound is still fragile and

largely dependent on macro-economic stability, consistent energy supply, and policy continuity.

If GDP growth accelerates beyond 3–4% in the coming years, analysts

expect auto demand to rise proportionally, potentially crossing 300,000 annual units in the passenger car segment within the next five years.

Contd on page 5



and localization, for sure is no longer a slogan but a survival strategy — one that determines whether Pakistan will remain an assembly-based market or emerge as a manufacturing powerhouse.

As Pakistan's economy shows early signs of stabilization, the automobile sector is once again finding its footing. After two years of contraction triggered by high inflation, currency depreciation, and import restrictions, the industry is now witnessing a modest rebound — marked by renewed sales, policy discussions on localization, and gradual technological adoption. Yet, the road to self-reliance and sustainable growth remains long and challenging.

Localization — A Critical but Elusive Goal

For over three decades, localization has been a recurring theme in Pakistan's automotive policy framework. The idea is simple: increase local production of auto parts, reduce dependence on imports, and ultimately create a globally competitive supply base. However, the reality has been mixed.

According to industry experts, Pakistan's automobile industry currently achieves 40–45% localiza-

tion in small cars and 25–30% in larger vehicles and SUVs, while motorcycles have achieved over 90% local content. The progress, although noteworthy, remains far behind regional

peers such as India and Thailand, where localization exceeds 80%. The Auto Industry Development and Export Policy (AIDEP) 2021–26 aims to deepen local manufacturing through tax incentives, localization targets, and support for vendor development. Yet, challenges persist — particularly inconsistent policy enforcement, frequent import-based assembly, and limited technological transfer from foreign partners.

Localization is not just an industrial goal; it is an economic necessity. Every imported component places additional strain on Pakistan's foreign exchange reserves. Experts estimate that over \$1.5 billion annually is spent on importing completely knocked-down (CKD) kits. With the rupee's volatility, this model has become increasingly unsustainable.

As one auto executive put it, "Localization is the only way forward — not just for industry survival but for economic sovereignty."

Economic Linkages and Contribution to GDP

The automobile industry contributes approximately 2–3% to Pakistan's GDP and supports over 4 million direct and indirect jobs. It influences a wide ecosystem that includes auto parts manufacturers,



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Pakistan's Electric Future: Building the Roadmap for EV Charging Infrastructure

As the global automobile industry accelerates toward electric mobility, Pakistan too finds itself at the threshold of a technological shift.

With rising fuel costs, growing environmental concerns, and the promise of reduced import dependence, electric vehicles (EVs) have emerged as a strategic necessity rather than a futuristic luxury. Yet, the transition hinges on one fundamental prerequisite — the development of a robust EV charging infrastructure.

The Early Stage of a Long Journey

Pakistan's electric vehicle journey officially began with the introduction of the Electric Vehicle Policy 2020–25, which set ambi-

tious targets — 30% of all new vehicle sales to be electric by 2030, and 90% by

operate across major cities such as Karachi, Lahore, and Islamabad. Most of these are

government has recently encouraged oil marketing companies (OMCs) and dis-

foreign exchange reserves. Moreover, EVs align with Pakistan's commit-

have launched pilot charging stations.

International collaboration could play a pivotal role. Learning from China's and India's models, Pakistan can leverage concessional financing and technology transfer agreements to accelerate charger deployment, especially DC fast-charging networks along the motorway system.

Renewable Energy and the Green Link

EV charging and renewable energy must grow together. If Pakistan's EVs are powered by fossil fuel-based electricity, the environmental benefits will be diluted. The country's Alternative and Renewable Energy Policy 2019 aims for 60% clean energy by 2030 — a goal that complements EV adoption.

Solar-powered charging stations, particularly in remote areas and industrial parks, could reduce dependence on the national grid. With solar tariffs declining and net-metering frameworks already in place, hybrid solar-EV charging models are both viable and sustainable.

Challenges Along the Way

Despite promising prospects, Pakistan's EV infrastructure faces several constraints:

High cost of charging equipment and installation, limiting investment incentives.

Lack of unified standards and regulations for chargers and connectors.

Limited public awareness and skepticism about EV performance, range, and maintenance.

Policy inconsistency and import restrictions on batteries and charging components.

These hurdles can only be addressed through coordinated policy implementation, industry collaboration, and incentives for early investors.

The Road Ahead

Realistically, Pakistan's EV charging ecosystem will take root over the next decade, driven by urban centers first, and gradually expanding to intercity corridors. The government's role will be critical — not only in setting regulations but also in ensuring investment security, power grid readiness, and tariff rationalization.

If executed effectively, this transition can create a new industrial sub-sector, generate thousands of skilled jobs, reduce oil dependence, and contribute directly to GDP growth through technology and manufacturing spillovers.

In the long run, EV infrastructure development could mark a turning point — transforming Pakistan from an oil-importing economy to an energy-efficient, green mobility hub in South Asia. ■



2040. However, progress has been slow and scattered.

At present, fewer than 100 public charging stations

small-scale installations by automakers or private energy firms, catering primarily to early EV adopters. The

tribution companies (DISCOs) to install EV chargers at fuel stations, but large-scale adoption remains in its infancy.

Experts estimate that it will take at least 7–10 years for Pakistan's EV charging network to reach a meaningful scale — one where electric mobility becomes practical for the masses. In this time, both public and private investment must converge to establish hundreds of fast-charging stations along highways, in cities, and at workplaces.

Economic and Environmental Imperatives

The push for EVs is not only about innovation — it is a matter of economic survival. Pakistan spends over \$10 billion annually on petroleum imports. With global oil price volatility, shifting even a fraction of the national vehicle fleet to electric mobility could significantly ease pressure on

ments to reduce carbon emissions under the Paris Agreement. The transport sector accounts for roughly 40% of total petroleum consumption and nearly 30% of energy-related CO₂ emissions. Electrification could help the country move toward a cleaner, more sustainable energy model.

The Power Generation Equation

The adoption of EVs will inevitably reshape Pakistan's electricity demand dynamics. As of 2025, the country's installed power generation capacity exceeds 45,000 MW, yet actual utilization remains far lower due to transmission bottlenecks and distribution inefficiencies.

If EV penetration rises to 10% of total vehicles by 2035, experts project an additional 5,000–6,000 MW of electricity demand — a manageable figure, provided grid infrastructure and renewable generation improve in tandem.

This transition could actually benefit the power sector, which currently faces surplus capacity during off-peak hours. EV charging — especially overnight — would help absorb excess electricity, improve plant utilization factors, and stabilize the financial performance of power producers.

However, without smart grid management and coordinated planning, mass EV charging could also strain local distribution networks, leading to voltage fluctuations and localized overloads. Hence, the integration of smart charging systems, time-of-use tariffs, and renewable energy linkages will be vital for long-term success.

Public-Private Collaboration: The Missing Link

While the government has initiated policy support, the real momentum must come from partnerships with the private sector.

Companies like BYD, MG, and Changan — which have announced plans for local assembly of EVs — are also exploring charging ecosystem investments. Similarly, K-Electric, PSO, Shell Pakistan, and Attock Petroleum

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Assessing Investment Strength of Pakistan's Private Auto Industry

Pakistan's private auto industry is at a pivotal juncture, with the government pushing for localization of auto parts and the global market shifting toward electric vehicles (EVs).

For the industry to transform from an assembly-based model to a manufacturing powerhouse, companies must demonstrate financial resilience, strategic vision, and investment capacity.

Financially Strong Players

Among the leading original equipment manufacturers (OEMs), Indus Motor Company (Toyota), Pak Suzuki Motors, and Honda Atlas Cars remain the most financially robust. These companies consistently report stable revenues, healthy cash flows, and positive operating margins, enabling them to invest in plant expansion, modernization, and technology adoption. For instance, Indus Motor Company's focus on production efficiency and a diversified supply chain allows it to sustain operations even during economic slowdowns.

Medium-Tier Compa-

nies with Potential

Companies like Master Motors and Ravi Automobiles have shown significant growth in recent years but face working capital constraints. While they possess some asset base and market presence, their ability to finance large-scale localiza-

tion or EV projects depends on bank financing and government support. Strategic partnerships with global automakers or technology providers could enhance their investment potential.



tion or EV projects depends on bank financing and government support. Strategic partnerships with global automakers or technology providers could enhance their investment potential.

Challenges in Investment Readiness

Several smaller private players and auto parts manufacturers in Pakistan continue to face limited access to capital, high debt ratios,

and cash flow pressures. This constrains their ability to invest in modern production lines, research and development (R&D), and EV infrastructure. Without targeted government incentives or foreign collaboration, these companies may struggle to contribute

Government Support and Strategic Incentives

The government's push for localization of auto parts and potential tax breaks for EV manufacturing could significantly impact investment capacity. Companies like Honda Atlas and Indus Motor are likely to benefit, given their robust balance

Pakistan's Auto Sector

Contd from page 1

Strengths of Pakistan's Auto Industry

Large Domestic Market: With over 240 million people and an expanding urban middle class, Pakistan offers strong latent demand for vehicles. Car ownership remains among the lowest in Asia — less than 20 vehicles per 1,000 people — indicating vast room for expansion.

Established Vendor Base: The auto parts industry, concentrated in Karachi, Lahore, and Faisalabad, has developed decades of expertise in manufacturing metal, rubber, and plastic components. Companies like Millat Equipment and Thal Engineering have achieved global certifications, supplying even to export markets.

Motorcycle Localization Success: The two-wheeler segment is a model of successful indigenization, with local production exceeding 2 million units annually and localization above 90%.

Policy Support and Investment Opportunities: The government's EV policy and incentives for new entrants have drawn interest from Chinese and European automakers. Partnerships with BYD, MG, and Changan hint at a more diverse market ahead.

Weaknesses and Challenges

Dependence on Imports: Despite decades of opera-

tion, major assemblers still rely heavily on imported CKD kits. This makes the industry vulnerable to currency fluctuations and supply chain disruptions.

Policy Inconsistency: Frequent changes in tariffs, import duties, and industrial policy discourage long-term investment in local manufacturing.

Limited Technological Transfer: Foreign joint ventures often keep advanced manufacturing technology abroad, limiting Pakistan's ability to develop indigenous innovation and design capabilities.

High Vehicle Prices: Localization has not yet translated into affordability. Car prices in Pakistan remain among the highest in South Asia relative to income levels, restricting mass motorization.

Energy and Infrastructure Bottlenecks: Unreliable power supply and logistical inefficiencies raise production costs, hampering competitiveness.

The Road Ahead — Policy, Innovation, and Green Mobility

For Pakistan's auto sector to evolve beyond assembly and truly localize, it must align with broader economic reforms. This means stable policies, technology transfer agreements, and an aggressive focus on research and development (R&D).

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Dewan Automotive Engineering Eyes Revival Amid Capital Constraints; Group Reports Mixed Results

The Dewan Group of Companies has reported a mixed financial and operational performance across its listed entities for the fiscal year ended June 30, 2025, reflecting persistent challenges in liquidity, market conditions, and plant utilization.

The Group — comprising Dewan Automotive Engineering Limited, Dewan Cement Limited, Dewan Farooque Spinning Mills



Limited, and Dewan Salman Fibre Limited — continues to focus on financial restructuring, efficiency improvements, and strategic revival of industrial operations.

Dewan Automotive Engineering Limited (DAEL) Leading the Group's industrial portfolio, Dewan

Automotive Engineering Limited (DAEL) remained constrained by limited working capital during FY2025, preventing the resumption of full-scale production despite renewed vehicle assembly activity by a sister concern, historically one of its major customers.

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Pakistan's Auto Sector

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The transition to electric and hybrid vehicles (EVs) presents both an opportunity and a challenge. If handled strategically — with local battery assembly, charging infrastructure, and skilled workforce development — Pakistan could leapfrog to cleaner mobility while reducing import dependence.

Similarly, regional trade integration under CPEC (China-Pakistan Economic Corridor) could help local manufacturers access advanced technologies, expand export potential, and

tap into Central Asian and Middle Eastern markets.

The auto sector stands at a crucial juncture. Localization is no longer a slogan but a survival strategy — one that determines whether Pakistan will remain an assembly-based market or emerge as a manufacturing powerhouse. With consistent policy support, technological collaboration, and an enabling macroeconomic environment, the industry has the potential to become a pillar of Pakistan's industrial revival and a catalyst for sustainable GDP growth. ■

Moon Lace Industry Celebrates Silver Jubilee

Moon Lace Industry, a trusted name in Pakistan's textile sector, proudly celebrated its 25th anniversary with a grand Award Distribution Ceremony held at Arena Rangoli Restaurant, Karachi.

The event brought together prominent personalities from the garment, towel, hosiery, and textile industries, marking a significant milestone in the company's journey of excellence and innovation.

The Chief Guest, Muhammad Ikram Rajput, President of the Korangi Association of Trade &

Industry (KATI), distributed awards among distinguished industrialists and extended warm congratulations to Moon Lace Industry on completing 25 successful years of operations.

The Managing Partners,

Notable attendees included Junaid Naqi Allahwala, Former President, KATI; Dr. Istiak Baig, Honorary Consul General of Morocco; Junaid Rehman, Senior Vice Chairman, Towel Manufacturers Asso-

Fabric" as a testament to the company's unwavering commitment to quality, innovation, and integrity. He proudly stated that all Moon Lace products are OEKO-TEX® Standard 100 certified, ensuring international quality standards, safety, and consumer confidence.

The event's theme, "Excellence in Every Thread – Celebrating 25 Years of Trust & Quality," reflected the company's enduring values and forward-looking vision.

The ceremony concluded with guests commending Moon Lace Industry's outstanding achievements and extending their best wishes for its continued growth and success. - PR ■



Syed Rashid Ali Shah and Shahid Azeem, expressed heartfelt gratitude to all valued guests and appreciated the dedicated efforts of their team in achieving this remarkable success.

ciation; and Muhammad Hasan Masood, President, MDA Development Forum.

In his address, Syed Rashid Ali Shah highlighted Moon Lace Industry's journey "From Yarn to Narrow

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EMCO Industries' Electrical, Mechanical Lab Accredited

EMCO Industries Limited, one of Pakistan's oldest and most established electrical

in October 2023.

Equipped with advanced German and Japanese testing systems, the laboratory can perform tests up to 1,800 kV impulse level and 600 kV power frequency level, mak-

ISO 17025 Lab Accreditation



equipment manufacturers, has achieved a major milestone with the ISO/IEC 17025 accreditation of its High Voltage and Mechanical Testing (HVMT) Laboratory by the Pakistan National Accreditation Council (PNAC).

The accreditation recognizes EMCO's HVMT Laboratory as a fully competent and independent testing service provider, affirming its ability to perform high-voltage and mechanical testing in accordance with international standards. This certification places EMCO among a select group of organizations globally that meet the stringent requirements of ISO/IEC 17025 — the benchmark for testing and calibration laboratories.

A Milestone in Technological and Quality Excellence

EMCO stated that the accreditation underscores its long-term commitment to technical innovation, quality assurance, and customer confidence. The HVMT Laboratory now provides accredited third-party testing services for high-voltage insulators, switchgear, and substation components, catering to both domestic and international power utilities, equipment manufacturers, and engineering contractors.

"This accreditation not only validates the precision and reliability of our testing processes but also enhances Pakistan's capacity to support its own power infrastructure with internationally certified facilities," the company said in its statement.

Pakistan's First High-Voltage Laboratory of Its Kind

The accreditation follows EMCO's earlier disclosure on April 1, 2024, announcing the commissioning of the country's first and highest-capacity high voltage testing facility (HVLAB), completed

ing it the only such facility in Pakistan. This capability enables EMCO to independently test transmission-class insulators, bushings, and other high-voltage equipment in accordance with IEC, ASTM, and ANSI standards — capabilities that were previously accessible only abroad.

Supporting the Power Sector and Industrial Self-Reliance

Founded in 1954, EMCO Industries Limited is a public listed company engaged in the manufacture and supply of high-voltage porcelain insulators, switchgear, and substation equipment. Over seven decades, the company has established itself as a key contributor to Pakistan's power transmission and distribution network, supplying critical components to the National Transmission and Despatch Company (NTDC), DISCOs, and independent power producers (IPPs).

EMCO also serves export markets in the Middle East, Africa, and South Asia, reinforcing its presence as a regional leader in power infrastructure components. The company's continued investments in testing, research, and product innovation align with Pakistan's broader goals of industrial self-reliance and reduction in import dependency for high-voltage equipment.

Looking Ahead

With its ISO/IEC 17025 accreditation now in place, EMCO aims to further expand its testing services portfolio and collaborate with utilities, EPC contractors, and research institutions to strengthen local testing capabilities.

The company's management reaffirmed its vision of transforming EMCO into a center of excellence for electrical testing and manufacturing in South Asia, driving both technological advancement and quality assurance across Pakistan's energy and industrial sectors. — ER Report

NETSOL to Train 1,600 Professionals in AI, Cybersecurity

NETSOL Technologies Limited — a leading global provider of IT and enterprise software solutions — has announced that its subsidiary, NETSOL Institute of Artificial Intelligence (Pvt.) Ltd., has entered into a landmark partnership with the National Vocational & Technical Training Commission (NAVTTTC) to train 1,600 individuals in Artificial Intelligence (AI), Data Science, and Cybersecurity.

The initiative marks a major step toward developing Pakistan's digital talent ecosystem and addressing the growing demand for skilled professionals in cutting-edge technologies. Through this collaboration, NETSOL and NAVTTTC aim to enhance employability, foster innovation, and strengthen the country's competitiveness in the global technology market.

gy market.

Endorsing the partnership, Mr. Salim Ghauri, CEO and Founder of NETSOL Technologies, said:

"This milestone initiative aims to develop a robust pipeline of skilled digital professionals, aligning with Pakistan's vision for a thriving digital economy. By addressing the urgent need for future-ready talent, the collaboration reinforces NETSOL's ongoing commitment to national capacity building and global tech competitiveness."

The collaboration underscores NETSOL's continued leadership in promoting innovation, technology education, and sustainable growth within Pakistan's IT landscape. According to the company's communication shared with the Pakistan Stock Exchange (PSX), the partnership is a testament to NETSOL's mission of combining business excellence with social impact.

About NETSOL Technologies Limited

Founded in 1995 and headquartered in Lahore, NETSOL Technologies Lim-

ited (PSX: NETSOL) is a global enterprise software provider specializing in digital transformation solutions for the asset finance and leasing industry. With a strong footprint across North America, Europe, and Asia-Pacific, NETSOL serves many of the world's leading automotive and financial institutions. The company's flagship product suite, NFS Ascent™, is recognized for its advanced digital architecture, automation, and scalability.

In fiscal year 2024–25, NETSOL demonstrated resilient performance amid global economic challenges. The company reported steady growth in its recurring revenue streams, supported by new client acquisitions and ongoing expansion in international markets. Its continued focus on innovation, AI-driven technologies, and cloud-based platforms has positioned NETSOL as one of Pakistan's most successful technology exporters, contributing significantly to the country's IT exports and employment generation.

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Project: HKB Hypermarket
Building Type: Office
Location: Peshawar
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Project: Zongmpak Head Office
Building Type: Office
Location: Islamabad
Capacity: 1,800 Ton





Agriculture Review



Penalty Against Al-Ghazi Tractors Set Aside

Al-Ghazi Tractors Limited (AGTL) has announced that the Competition Appellate Tribunal has overturned the penalty order previously issued by the Competition Commission of Pakistan (CCP).

The initial order imposed a fine of PKR 40 million on AGTL, and that penalty has now been set aside.

Why was the company penalized?

The CCP had alleged that AGTL had engaged in anti-competitive practices in the tractor market of Pakistan. These allegations related to pricing mechanisms and dealer arrangements that, according to the regulator, restricted competition and consumer choice in the agricultural machinery sector. The penalty of PKR 40 million was imposed in May 2025 following the CCP's investigation.

With its appeal accepted, AGTL has cleared this regu-

latory hurdle and restores its standing without the consequences of that fine.

The company has recently shifted its registered office to Lahore from Karachi.

Where it stands as a



company

Incorporated in June 1983 and commencing operations in September of the same year, Al-Ghazi Tractors Limited is a public listed company engaged in the manufacture and sale of agricultural tractors, generators, implements and spare parts.

The company's manufacturing plant is located at Dera Ghazi Khan, Punjab, and it operates under a tech-

nical collaboration with New Holland / CNH Industrial N.V. for tractor technology.

AGTL has a production capacity of over 30,000 tractors per annum (single shift) at its DG Khan facility.

The company also boasts

a localization rate of approximately 92% local content in its manufacturing — one of the highest in the country.

Recent Sales

As per its interim report for the period ended 31 March 2025, AGTL sold 1,422 tractors — a decline of 62.52% compared to 3,794 units sold in the same period last year. The company cited macro-economic uncertainty, a challenging

taxation environment and constrained farmer liquidity as contributing factors.

For the half-year ended June 30 2024, the company produced 6,990 tractors and sold 6,979 units, against 7,108 units sold in the same period a year earlier.

Localization of Tractor Parts

Al-Ghazi Tractors has emphasized local sourcing of components and parts,

achieving about 92% local content in production. This high localization ratio underlines their commitment to reducing import dependency, strengthening the domestic manufacturing base and serving Pakistani agriculture with locally-produced equipment.

What This Means

With the Competition Appellate Tribunal's decision in its favour, AGTL not

only removes a regulatory burden, but also reinforces its position to focus on manufacturing and market performance without the overhang of the penalty. For the broader tractor industry in Pakistan — which remains subject to government policy, financing availability and rural liquidity — the company's operations and its localization achievements remain significant.■

Four Brothers' Breakthrough in Cotton for Pothwar Farmers

In a remarkable stride toward climate-resilient agriculture, Four Brothers Group has successfully developed a heat- and 50-day drought-tolerant cotton variety at its research facility in Chakwal.

The initiative aims to empower farmers in the

Pothwar region, where extreme weather and water

scarcity have long hindered cotton cultivation. As part of its commitment to sustainable farming, the company has announced that in 2026, it will distribute free cotton seed for one acre to farmers in Pothwar, enabling them to cultivate what is being described as one of the world's best cotton varieties. This initiative reflects Four Brothers' dedication to advancing agricultural innovation, improving farmer livelihoods, and strengthening Pakistan's cotton economy through locally adapted, high-performance seed technology.■



scarcity have long hindered cotton cultivation. As part of its commitment to sustainable farming, the company

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Engr. Salih Rind Promoted to Chief Engineer at SSGC

Hyderabad, Pakistan – Engr. Salih Rind has been promoted to Chief Engineer (Transmission Section – of Hyderabad Head Qurtor) at Sui Southern

Gas Company (SSGC). In his announcement, Engr. Rind expressed his gratitude to the company's management — Managing Director, DMD Mr. Saeed Rizvi, and SGM (Transmission) Mr. Jamshed Nisar — for their trust and support. He reaffirmed his commitment to continue contributing with dedication and professionalism.



Gas Company (SSGC).

Engr. Rind brings extensive experience in the energy sector, having served SSGC for many years. He holds a Bachelor's degree in Electrical Engineering from Mehran University College of Engineering, Science & Technology, Nawabshah, and a Master's degree in Environmental Engineering from MUET Jamshoro. He

for the 2018–2021 term and is currently serving another tenure (2024–2027). He also contributes to several PEC committees and is affiliated with The Engineers Pakistan (TEP) — the country's largest network of engineers — led by Engr. Jawed Salim Qureshi.

His peers regard him as an influential voice in professional development, engineering policy, and sectoral advancement in the province.

With this promotion, Engr. Rind is expected to play a pivotal role in strengthening SSGC's transmission operations in Hyderabad, further enhancing the region's energy infrastructure and advancing the company's strategic goals. — ER Report

has been instrumental in developing the HSE Management System at SSGC and is currently responsible for managing high-pressure transmission pipeline systems across the region.

Beyond his professional responsibilities, Engr. Rind is an active and respected figure in the engineering community of Sindh. He previously served as an elected member of the Governing Body of the Pakistan Engineering Council (PEC)

application and potential turns into performance.

As one senior engineer at the ceremony put it, "This is not just a program; it's an investment in the country's technical future. But this time, we must make sure it delivers." ■

Dewan Automotive Engineering Eyes Revival Amid Capital Constraints; Group Reports Mixed Results

Contd from page 6

The Chairman informed shareholders that the Company has cleared all liabilities with financial institutions and is actively pursuing new financing lines to restart operations. Once funding is secured, production and sales are expected to resume.

Auditors issued a qualified opinion, citing operational suspension under the "basis of adverse opinion." However, management prepared the financial statements on a going concern basis, expressing confidence in an operational revival following the anticipated capital inflow.

Dewan Cement Limited (DCL)

Dewan Cement Limited showed significant improvement in its financial performance, achieving a turnaround in profitability despite a 4% drop in net sales caused by periodic maintenance shutdowns and higher government levies.

The Company's gross profit margin improved to 7% from 2% a year earlier due to strict cost controls and efficiency gains. DCL posted a profit before levies and taxes of Rs. 351 million, compared to a loss of Rs. 611 million last year. However, after accounting for a deferred tax provision of Rs. 953 million, the Company reported a loss after tax of Rs. 967 million.

Cement dispatches declined by 9.4% to 1.43 million tons, reflecting a softer demand environment. Notably, DCL commissioned a 6 MW solar power project during the year, cutting energy costs and reinforcing its

sustainability agenda.

Auditors raised qualifications regarding the classification of a Rs. 2.91 billion pre-IPO investment and non-provisioning of Rs. 794.55 million markup, though management indicated that restructuring discussions with lenders are in advanced stages and reiterated the going concern assumption, supported by improving cash flows.

Dewan Farooque Spinning Mills Limited (DFSM)

Dewan Farooque Spinning Mills continued to face financial pressures, with net revenue falling to Rs. 219.25 million (2024: Rs. 446.38 million) and a gross loss of Rs. 239.68 million, primarily due to limited liquidity and production constraints.

Despite these challenges, the Company made strategic technology upgrades, replacing aging ring-spinning machinery with Auto Coro Spinning systems to enhance efficiency, productivity, and yarn quality. Management plans additional modernization and capacity expansion once working capital is stabilized.

DFSM continued minimal contract-based operations to maintain plant readiness and is engaged in debt restructuring negotiations with lenders to revise repayment terms without markup.

Auditors issued a qualified opinion, citing loan defaults and going concern uncertainty, though management expressed confidence in the support of sponsors and ongoing negotiations to secure operational continuity.

Dewan Salman Fibre

Limited (DSFL)

Once Pakistan's largest polyester and only acrylic fibre manufacturer, Dewan Salman Fibre Limited remained non-operational throughout the year. The Company reported no turnover and a gross loss of Rs. 283.05 million (2024: Rs. 411.88 million), primarily due to fixed overheads and depreciation.

Management reaffirmed its commitment to reviving domestic fibre production, highlighting the economic drawbacks of heavy reliance on imported polyester and acrylic fibres, which strain foreign exchange reserves and limit employment opportunities.

Negotiations with financial institutions for debt restructuring and markup waivers remain ongoing but have progressed slowly. Auditors issued an adverse opinion, questioning the going concern assumption; however, management maintained optimism about a favorable resolution and the eventual restart of operations.

Group Outlook

Despite operational and financial headwinds, the Dewan Group remains focused on its revival and restructuring strategy, emphasizing cost optimization, renewable energy adoption, and modernization of manufacturing assets.

The Group aims to gradually restore industrial capacity across its automotive, cement, textile, and fibre segments — a move expected to support employment generation, local manufacturing, and Pakistan's broader industrial base in the years ahead. — ER Report ■

House Job Training for Engineers

Contd from page 2

professional culture of engineering in Pakistan" — provided the process remains transparent, consistent, and results-oriented.

Toward a Competent and Competitive Workforce

For Pakistan's thousands

of young engineers entering a competitive job market each year, the Graduate Engineer Trainee Program represents both an opportunity and a test. If implemented effectively, it could become a model for sustainable professional development — a platform where learning meets

application and potential turns into performance.

As one senior engineer at the ceremony put it, "This is not just a program; it's an investment in the country's technical future. But this time, we must make sure it delivers." ■

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Integrating Sustainability and Scalability in Technology Startups

Engr. Dr. Muhammad Nawaz Iqbal



Scalability and sustainability are no longer antagonistic concepts in technology startups, but rather two complementary forces determining the achievement and longevity of contemporary enterprises.

Although in the early years of their businesses, entrepreneurs focused on achieving high growth instead of high sustainability, the innovative entrepreneurship of the modern generation understands that scalability is driven by sustainable innovation rather than being its barrier. Startups that combine environmentally friendly design, the principles of the circular economy, and mindful use of technology are establishing a new paradigm of an environmentally conscious business model that can develop without draining natural or social resources.

The sustainability of a startup starts with the very concept of the product. Entrepreneurs are coming up with less wasteful, energy-efficient, and resource-conscious solutions from inception. Sustainability does not simply involve creating green technologies; it also entails embedding environmental intelligence into each operational layer, such as production, logistics, marketing, and even

customer engagement. A new movement known as design for regeneration emphasizes designing products to positively contribute to ecosystems rather than merely minimizing negative effects.

Sustainability demands scaling within a sustainable framework, meaning growth metrics need to be reimagined. Rather than using profit or market share as the sole measures of success, visionary startups adopt metrics such as carbon neutrality, resource efficiency, and social inclusion. This paradigm shift enables startups to grow responsibly and remain competitive. When growth aligns with environmental ethics, scaling becomes a regulated expansion rather than a mad rush, ensuring no harm to people or the planet.

Scalability and sustainability coexist through digital transformation. Artificial intelligence (AI), the Internet of Things (IoT), and blockchain technologies ensure supply chain transparency and traceability, allowing startups to scale operations without compromising environmental commitments. For example, carbon tracking using blockchain enables businesses to verify sustainability claims in real time, enhancing accountability and credibility as they expand globally.

Additionally, cloud com-

puting allows growing companies to dynamically scale their computational requirements, reducing physical infrastructure and energy waste. When based on renewable energy, cloud-based architectures make scalability a sustainable competitive advantage. Green scalability is achieved when resource optimization and digital efficiency converge, so that increasing user numbers or data processing does not directly result in environmental costs.

The funding strategy of a sustainable startup is also evolving. Investors increasingly favor ventures that are both profitable and impactful. Impact investors, green venture capitalists, and ESG (Environmental, Social, Governance) funds are redefining the startup ecosystem. Startups that integrate sustainability into their scaling narrative not only attract capital but also gain long-term commitment from partners and customers who share similar values.

Culture is a determining factor in combining sustainability and scalability. When a team internalizes environmental consciousness and social responsibility, it fosters innovation that would otherwise not emerge. Employees engaged with a purpose-driven mission become brand ambassadors and problem solvers, generating solutions that are

sustainable over time and grow with the organization. Culture, therefore, serves as both the foundation and engine of sustainable growth.

Local adaptability and international applicability determine whether sustainable startups are truly scalable. Successful ventures localize products and models to regional needs—such as renewable microgrids in emerging markets or AI-based recycling systems in metropolitan areas—without losing a global perspective. This dual approach of localization and standardization ensures inclusivity, resilience, and wide market penetration without compromising the sustainability ethos.

By integrating circular economy principles into scalability planning, waste is transformed into opportunity. Startups design products to be reused, recycled, or upcycled, generating new value streams while reducing material dependency. For example, tech startups that resell electronic parts or reuse data center heat in urban energy grids illustrate how circularity can create a competitive advantage in scaling.

Key sustainability aspects of scalable technology include digital ethics and data responsibility. As startups grow, their data footprint and algorithmic power increase. Scalability of

trust and technology requires ethical AI, responsible data management, and inclusivity. Startups that prioritize transparency in data usage maintain legitimacy and user trust as their reach expands.

Energy management innovations also link scalability and sustainability. Startups experiment with low-power algorithms, decentralized computing, edge computing, energy-efficient code generation, and server optimization. These strategies reduce operational costs while creating lighter, more flexible infrastructure, demonstrating that efficiency is a new growth engine.

Sustainable scaled environments are enhanced through collaborative ecosystems. Startups partnering with academia, government, and industry leaders in green technology establish knowledge and resource networks. Such collaborations enable rapid scaling of solutions through co-creation, pilot programs, shared infrastructure, and minimized redundancy, transforming competition into joint innovation.

Sustainable scalability also requires rethinking relationships with consumers. Long-term engagement business models focus on value rather than volume. Subscription systems, product-as-a-service models, and digital steward-

ship replace linear sales models with cyclical interactions, driving continuous improvement, waste reduction, and customer satisfaction.

The convergence of sustainability and scalability strengthens resilience. Businesses built on renewable, adaptive, and ethical principles are better equipped to handle market disruptions, regulatory changes, and environmental crises. Agile, modular systems allow scaling up or down without collapse, making resilience the invisible multiplier of sustainable scalability.

Finally, integrating sustainability and scalability represents a novel entrepreneurial philosophy: technology is not just a means of growth but a means of regeneration. Every line of code, every unit produced, and every market penetrated contributes positively to the planet and its inhabitants. Startups embracing this mindset will not only lead the next wave of global innovation but also redefine responsible growth—balancing progress with conservation. ■

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وہ طاقت جس کے قبضہ قدرت میں آج ہندوستان ہے وہ
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SOME OF OUR BELOVED PROPHETS

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PART ONE

With Adam, the chain of prophets did begin...
— He was led by Satan to the tree forbidden.

God taught him and Eve a path from that situation...
— They prayed, "Our Lord, if You forgive us not,
nor show compassion,

We shall face humiliation...
— For we have been led astray by our temptation."

To Moses and Aaron, the Criterion was given...
— To guide the faithful towards their blessed haven
in heaven.

Moses declared, "My Lord is with me; He will show
me guidance..."
— Consequently, Pharaoh was drowned for his dis-
obedience.

In Midian, Moses cried to his Lord in desperation...
— "Whatever blessings You bestow upon me, I am
in need of Your compassion."

He was granted great abundance...
— Family, shelter, and a noble companion.

Before them rose Abraham, wise and diligent...
— A faithful servant, both steadfast and benevolent.

He stood against idolators, unmoved and deter-
mined...
— Saying, "Why are you to these false gods obedi-
ent?"

"In error you dwell," he proclaimed in frustration...
— "Your Lord is the one Creator—worthy of sub-
mission."

When from their feast day, the idol-worshippers
returned...
— they found their false gods, into fragments
turned,

Except the big one, unaware what did happen...
— Abraham purposefully left him unbroken.

"To our devoted ones, have you caused this destruc-
tion?"...
— They asked him, filled with rage and little reason.

He replied, "Ask the great one; perhaps he has
done...
— If he is truly a god, surely he will answer your
question."

They said, "Not a word indeed has he ever spo-
ken..."
— Abraham asked, "Then why is he worshipped
with submission?"

They threw him into the blazing fire in retaliation...
— But by God's command, it turned into a garden
of jubilation.

Ibrahim, called out to his Lord: "Raise a prophet
amongst the ignorant...
— Who will recite holy verses, and purify them
with book and wisdom."

Abraham's companion, Lot, was granted wisdom...
— And saved from a people lost in lust for men
instead of women.

Ibrahim was blessed with Ishaq and Yaqub in addi-
tion...
— Righteous leaders, leading with divine guidance.

They taught noble actions...
— Like prayer and charity from their possessions.

PART TWO

Before them, Noah's prayer found acceptance...
— With his family, he found deliverance.

Against the disbelievers, his patience was beyond
description...
— The wicked were drowned by floods incessant—he
found divine protection.

Remember David and Solomon, wise in their judg-
ment...
— When a field was overrun by sheep, Solomon's deci-
sion was prudent.

David sang with birds and mountains, in perfect uni-
son...
— Crafting armor for preparation and protection—

To Solomon came winds, fierce yet in submission...
— And jinn who labored with order and precision.

Recall when Ayub cried, "I've been touched by afflic-
tion...
— You are the Most Merciful, the Fountain of compas-
sion!"

Allah restored his family and his possessions in greater
proportion...
— And promised similar outcome to all who bow to Him
in submission.

Let us not forget Ishmael, Enoch, and Zul-Kifl, each one
chosen...
— Steadfast in faith, unwavering in submission.

Remember when Prophet Yunus departed without permis-
sion...
— He prayed to God from the darkness of the whale's
prison:

"You alone are worthy of worship and admiration...
— I am one who has certainly strayed in deviation."

Delivered from darkness, he was granted freedom...
— Others too are freed when they seek His pardon.

Recall Zakariya's heartfelt invocation...
— When he prayed for a son in humble supplication.

His wife was cured, though she was old and barren...
— A son was born; as a prophet chosen and enlightened.

Prophet Yahya too, hastened to good actions...
— With both fear and hope, he fulfilled his obligations.

Remember Mary, pure and patient in devotion...
— Touched by the Holy Spirit—chosen for a noble mis-
sion.

Dead, lepers and blind were cured by her holy son...
— Who was raised to the heavens and would soon return.

In the end, the Prophet Muhammad (peace be upon him)
made his advent...
— The final messenger, divinely sent, for the noble mis-
sion.

He came with complete guidance...
— To perfect faith and prevail upon all in existence.

He said, "Allah is sufficient...
— Worthy of worship—besides Him, there is none."

Upon Him we depend...
— He is the Owner of the Throne, great and magnificent.

Verily, Allah and His angels send their salutation...
— Believers too mention him with glory, honor, and
admiration.

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سیٹلائٹ سے انٹرنیٹ کی صلاحیت حاصل کر لی، احسن اقبال

پاکستان کے ڈیجیٹل انفراسٹرکچر میں اہم سنگ میل، نوجوانوں کو روزگار ملے گا

وفاقی وزیر منصوبہ بندی احسن اقبال نے کہا کہ سیٹلائٹ کی ترقی کا انحصار خلائی ٹیکنالوجی میں مہارت حاصل کرنے پر ہے، پاکستان نے اب اپنے سیٹلائٹ کے ذریعے انٹرنیٹ سروس فراہم کرنے کی صلاحیت حاصل کر لی ہے جو ملک کے ڈیجیٹل انفراسٹرکچر میں ایک سنگ میل ہے، قرآن مجید میں ہمیں تحفہ کائنات کا حکم دیا گیا۔

بانی اسپید انٹر نیٹ اور کمرشل

سال کے دوران پاکستان نے چار سال سے خلا میں بھیجے ہیں، حکومت فائبر، فائبرجی اور کمرشل سیٹلائٹ ٹیکنالوجی کے استخراج سے ایک جدید اور منسلک پاکستان کی بنیاد رکھ رہی ہے، ای پاکستان کا مقصد نوجوانوں کو دنیا سے جوڑنا ہے تاکہ وہ ڈیجیٹل معیشت کا حصہ بن سکیں۔

علاوہ ازیں احسن اقبال نے قومی کانفرنس سے خطاب کرتے ہوئے کہا کہ جمہوریت کی بقا کا کردار اور شفافیت سے مشروط ہے، مقامی حکومتوں کو با اختیار بنائے بغیر جمہوریت مستحکم نہیں ہو سکتی۔



پاء میک نمائش، جنگی جہاز جناح کلاس فریگیٹ کا ماڈل متعارف

کراچی شپ یارڈ اینڈ انجینئرنگ ورکس لمیٹڈ کے ساتھ تیاری کا معاہدہ طے پا گیا، اینٹی سب میرین آپریشنز کے لیے جہاز ہیلی کاپٹر سے لیس ہوگا، کمانڈر عدنان

پاک بحریہ نے ایکسپو میں جاری پانی میک نمائش میں جنگی جہاز جناح کلاس فریگیٹ کا ماڈل متعارف کرا دیا، کراچی شپ یارڈ اینڈ انجینئرنگ ورکس لمیٹڈ کے ساتھ تیاری کا معاہدہ طے پا گیا، سن 2028 تک بحری بیڑے میں شامل ہونے والا مکمل پاکستانی ساختہ بحری جہاز اینٹی سب میرین آپریشنز، اینٹی سرفیس آپریشنز اور سمندر میں بحری قزاقی کے خلاف کارروائیوں کا حامل ہوگا، جناح کلاس فریگیٹ بل ماؤنڈ سونار (خطرات کا پتہ لگانے والے نظام) عرشے پر ہیلی کاپٹر لینڈ کرنے سمیت دیگر خصوصیات سے لیس ہوگا۔

ایکسپو میں کراچی میں پاکستان انٹرنیشنل میری ٹائم کانفرنس

ایڈ ایکسپو میں پاکستان نیوی نے جناح کلاس فریگیٹ کا دیو بیگل ماڈل متعارف کروا دیا، جس کو اصل شکل کے مطابق ریڈار،

تین ملٹی رول فریگیٹ ہے، جو کثیر خطرے والے ماحول میں آپریشن کرنے کی صلاحیت رکھتا ہے۔

خصوصی بات چیت کے دوران پاک بحریہ کے کمانڈر عدنان کا کہنا تھا کہ بحری جہاز کو پاکستان نیوی کے پلیٹ فارم ڈیزائن ورگ میں ڈیزائن کیا گیا ہے، اینٹی سب میرین آپریشنز کرنے کیلئے جہاز ایک ہیلی کاپٹر سے بھی لیس ہوگا، نیول شپ کلاسیفکیشن سوسائٹی ترک لیوڈ کے تیار کردہ ڈیزائن کی توثیق کر رہی ہے، جناح کلاس فریگیٹ کا پاکستانی ساختہ دیو ڈیزائن صلاحیت میں مکمل خود انحصاری کے حصول کی طرف بڑا قدم ہے۔ ان کا کہنا تھا کہ جناح کلاس فریگیٹ کیلئے کراچی شپ یارڈ اینڈ انجینئرنگ ورکس لمیٹڈ کے ساتھ معاہدہ کیا گیا اور پہلا جہاز 2028 میں پاک بحریہ کو دیا جائیگا۔

لنڈ اور سمندر سمیت دیگر آلات کے ساتھ ڈیزائن کیا گیا، جناح کلاس فریگیٹ پاکستان کا پہلا مقامی طور پر ڈیزائن کیا گیا جدید



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Workshops on Technologies under the Erasmus+ CATCH_VR Pr Digital Twin and AR/VR

Preamble: Under the Erasmus+ CATCH_VR Project, the GIK Institute of Engineering Sciences and Technology organized a series of specialized workshops focused on advancing knowledge and skills in emerging digital technologies.

The workshops aimed to enhance academic and industrial collaboration, foster digital innovation, and promote the adoption of Digital Twin, Augmented Reality (AR), and Virtual Reality (VR) technologies within Pakistan and partner countries. These initiatives align with the broader objectives of Erasmus+ in promoting capacity building in higher education and supporting innovation-driven learning ecosystems.

Digital Twin Workshop (17–18 September 2025)

The Hybrid Workshop on Digital Twin Technology was

Participants represented a diverse group of institutions and industries, including academic institutions such as Air University (AU), FAST, GIKI, ITU, NUST, MUET, AWKU, WUM, IBA, SSUET, PAF-IASST, NED, UET Peshawar, and HITEC, along with industrial and research organizations such as FFC, PINSTECH, MIB, FCCL, PMRU, SEMO, Dawlance, SUPARCO, Cherat Packaging, and Alkhidmat Health Foundation. International participation was noted from the Skolovo Institute of Science and Technology (Russia), University of Brescia (Italy), and University of Greenwich (UK).

The workshop commenced with an introductory session by Dr. Ali Turab Jafry (GIK Institute, Pakistan). He welcomed participants, outlined the objectives of the CATCH_VR project, and emphasized the strategic importance of Digital Twin technology in revolutionizing modern engineering and



twin solutions, laying the groundwork for more advanced simulation activi-

ties.

The session on 'Building Digital Twins in AnyLogic:

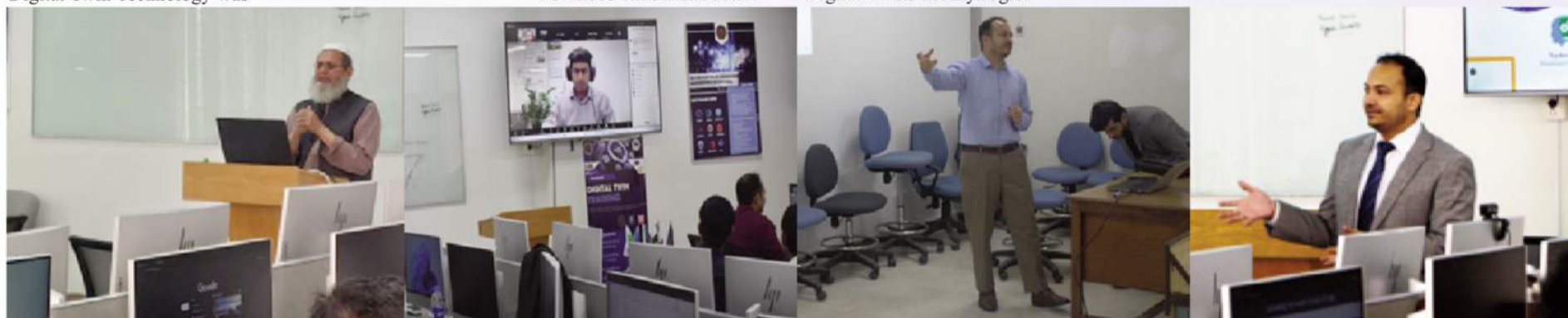
From Case Study to Modeling' was conducted by Dr. Sabah Suhail (Queen's University Belfast, UK). She guided participants through the process of translating conceptual digital twin models into simulation environments using AnyLogic. The session highlighted how system dynamics and discrete-event modeling can be integrated for complex process optimization. This segment was pivotal in bridging the gap between theoretical frameworks and simulation-based validation.

Day one concluded with a reflection and wrap-up session led by Dr. Ali Turab Jafry, where participants discussed key takeaways and collaborative opportunities. The group activity reinforced interdisciplinary learning and allowed attendees to exchange experiences on digital system integration. The day ended with a group photo and informal networking, reinforcing the sense of community and shared pur-

cal implementation of health-care-focused digital twins, demonstrating data integration techniques and patient-specific modeling approaches. Her insights emphasized the potential of digital twins in precision medicine and healthcare innovation.

Dr. Mubashar Iqbal (University of Tartu, Estonia) conducted the advanced session titled 'Practical Exercise: Building a Digital Twin Model with Microsoft Azure DT.' This segment allowed participants to implement real-time data connections, visualize performance metrics, and simulate operational behavior within Azure's environment. It was a cornerstone session that connected all previous learning outcomes and offered tangible experience in creating a working digital twin prototype.

The workshop concluded with closing remarks and a certificate distribution ceremony conducted by Dr. Waleed Tariq Sethi (GIK Institute, Pakistan). He com-



successfully conducted on 17–18 September 2025 at the GIK Institute, under the framework of the Erasmus+ CATCH_VR Project. The event attracted a total of 68 participants (58 males and 10 females), including representatives from academia, industry, and international organizations.

The workshop provided in-depth hands-on training and interactive sessions covering the following key topics:

- Microsoft Azure for Digital Twin development
- IoT integration for real-time data-driven systems
- AnyLogic for supply chain simulations and system modeling
- Heart-based Digital Twin for healthcare applications

manufacturing processes. His address highlighted the role of academia-industry partnerships in advancing digital transformation through applied research and practical implementation.

Mr. Fazail Bangash (GIK Institute, Pakistan) led two sessions on 'Microsoft Azure Fundamentals and Case Study.' These sessions introduced participants to cloud-based digital twin environments using Microsoft Azure. The content covered cloud architecture, data pipelines, and real-world case studies that demonstrated how Azure supports virtual modeling, system monitoring, and predictive maintenance. Participants gained practical insights into deploying scalable digital



pose among participants.

The second day opened with 'Industry Perspectives on Digital Twin in Healthcare and Practical Case Study (Part 1)' led by Dr. Shahabuddin Ansari (GIK Institute, Pakistan). He discussed how Digital Twin technology can transform patient monitoring, hospital operations, and predictive analytics in healthcare. This session established a practical understanding of how virtual modeling can optimize decision-making in clinical environments.

The following session, 'Industry Perspectives on Digital Twin in Healthcare (Part 2),' was presented by Ms. Syeda Sana Bukhari (GIK Institute, Pakistan). She expanded on the practi-

mended the participants for their engagement and highlighted the role of such initiatives in driving innovation, skill development, and global collaboration under the Erasmus+ CATCH_VR Project.

The participants appreciated the workshop's combination of theoretical insights and practical implementation sessions. The event successfully strengthened collaboration across academia, industry, and international partners, while advancing the CATCH_VR project's goals of integrating Digital Twin technologies into educational and industrial systems.

AR/VR Workshop (24–25 September 2025)

Following the success of

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Power Quality: The Hidden Tax on Your Bottom Line

By Farhan Mujeeb

In the relentless pursuit of operational efficiency and cost reduction, industrial facility owners meticulously track raw material costs, labour expenditures, and energy bills.

Yet a prevalent and often overlooked drain on profitability frequently operates in plain sight, hidden within the very sinews of the plant—the electrical distribution system. Poor power quality is a silent but relentless tax on the bottom line, manifesting not as a single line item on a utility invoice but as a cascade of increased costs, premature equipment failure, and frustrating production halts. Understanding this hidden adversary, primarily in the form of harmonics, voltage sags, and transients, is the first step toward reclaiming lost revenue and fortifying operational resilience.

The modern industrial floor is very different from the simple electrical loads of the past. The abundance of variable frequency drives (VFDs), programmable logic controllers (PLCs),

and switch-mode power supplies has brought unparalleled control and efficiency. However, these non-linear loads are also the primary cause of harmonic distortion. Harmonics are currents and voltages at multiples of the fundamental power frequency that contaminate the electrical sine wave. Unlike the smooth, oscillating wave of ideal power, a distorted waveform forces electrical systems to work harder. This results in elevated currents in neutral conductors, overheating of transformers and motors, and nuisance tripping of sensitive equipment.

The financial impact is direct and severe. Energy losses are dissipated as heat, leading to higher electricity bills, while the constant thermal stress systematically degrades insulation and windings, slashing the lifespan of critical assets and driving up maintenance and replacement costs. A motor or transformer may fail years before its expected service life, with the root cause mysteriously recorded as "unknown" when the true culprit was a corrupted power supply.

While harmonics represent a chronic, degenerative

condition, voltage sags or dips are the acute "heart attacks" of the industrial power system. A voltage sag is a short-term reduction in voltage, typically lasting from a few milliseconds to a few seconds, often caused by events remote from the facility, such as utility grid faults or the starting of large motors elsewhere on the site. For a facility filled with sensitive digital controls, a sag of even 20% can be catastrophic. PLCs lose their logic, industrial computers reboot, and contactors drop out, bringing a highly automated production line to an abrupt halt.

The cost of a single such event can be staggering. Consider the value of scrapped product in a continuous process, the additional efforts required for a complex restart procedure, and the opportunity cost of lost production time. These incidents are often misattributed to "glitches" or "unexplained" equipment behavior, allowing the recurring financial hemorrhage to continue unchecked.

Similarly, voltage transients—brief high-energy spikes caused by lightning

strikes or capacitor switching—act as assassins for electronic components, delivering a fatal blow to circuit boards and insulation in microseconds.

The good news is that this hidden tax is not inevitable. With a strategic approach to power quality mitigation, facilities can transition from being victims to becoming masters of their electrical environment. The solutions are both proven and highly effective. For the persistent issue of harmonic distortion, active harmonic filters (AHFs) represent the state-of-the-art solution. These sophisticated devices continuously monitor the waveform, instantly injecting equal but opposite harmonic currents to cancel out the distortion at its source. This results in a clean, stable sine wave, reduced neutral currents, and cooler-running equipment. The return on investment is realized through lower energy costs, extended equipment life, and the elimination of mysterious trips.

To combat the menace of voltage sags and provide instantaneous reactive power support, advanced

technologies like Static Synchronous Compensators (STATCOMs) and supercapacitor-based Dynamic Voltage Restorers (DVRs) are emerging as game-changing defenses. STATCOMs defend against voltage sags by injecting reactive current to stabilize the facility's main voltage, protecting entire sections of a plant. For the most critical loads, a DVR with a supercapacitor provides a more targeted solution, instantly injecting the precise missing voltage directly in series with the equipment. The supercapacitor's ability to discharge a massive burst of power in milliseconds makes it the ideal energy source, enabling the DVR to create this compensating voltage almost instantaneously to prevent downtime. This is the equivalent of an uninterruptible power supply (UPS) for an entire production line, safeguarding against costly downtime without the need for massive battery banks.

Ultimately, investing in power quality is not an expense but a strategic capital allocation with a compelling return. The initial cost of installing AHFs, voltage regulators, or surge

protection devices is quickly offset by the dramatic reduction in downtime, the extension of asset lifecycles, and the tangible decrease in energy consumption. The first step for any facility serious about curbing this drain is a comprehensive power quality audit. By deploying power analyzers to monitor the system, engineers can diagnose the specific pollutants present, quantify their financial impact, and design a targeted mitigation strategy.

In an era where margins are tight and reliability is paramount, ceasing to pay the hidden tax of poor power quality is one of the most straightforward ways to bolster resilience, enhance sustainability, and protect the core of industrial productivity. ■



Workshops on Technologies under the Erasmus+ CATCH_VR Project Digital Twin and AR/VR

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the Digital Twin workshop, the Hybrid AR/VR Workshop was organized on 24–25 September 2025 under the Erasmus+ CATCH_VR Project. A total of 30 participants (19 males and 11 females) attended the sessions, representing both academia and industry.

The workshop focused on providing participants with hands-on experience in the following areas:

- Unity 3D development for immersive environments
- Augmented Reality design and deployment on Android platforms
- Virtual Reality application creation and testing using Meta Quest Pro headsets

Participants were drawn from leading universities and organizations including Air University (Aerospace & Aviation Campus, Kamra), University of Peshawar, Mehran University of Engineering and Technology (Jamshoro), GIK Institute, UET Peshawar, COMSATS University Islamabad (Sahiwal Campus), Virtual University, Women University Swabi, AI in Healthcare – NCAI UET Peshawar, and University of Greenwich (UK). Industrial representation included Robotmea.

The workshop provided



an engaging and highly interactive environment for participants to develop and deploy immersive applications. It contributed significantly to capacity building in AR/VR technologies, aligning with CATCH_VR's mission to modernize teaching and learning through the integration of advanced digital tools.

Both workshops under the Erasmus+ CATCH_VR Project served as vital platforms for knowledge exchange, hands-on learning, and cross-institutional collaboration. By integrating practical exposure with advanced digital technologies, these events have strengthened the foundation for continued innovation and academic excellence across partner institutions. The positive engagement of participants demonstrates the growing relevance of Digital Twin and AR/VR technologies in engineering education and industrial applications.

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